

December 15, 2003

Ms. Sharon Jaffess Remedial Project Manager US EPA Region 5 Superfund Division 77 W. Jackson Blvd. (SR-6J) Chicago, IL 60604

RE: Technical Letter Report

Comparison of URS and SEH Work Plans Ashland/NSP Lakefront Site

WDNR BRRTS #02-02-000013 CERCLA Docket No. V-W-04-C-764

Dear Ms. Jaffess:

This Technical Letter Report (the Report) has been prepared to comply with the November 14, 2003 Administrative Order on Consent (AOC) for the RI/FS work on the Ashland/NSP Lakefront site. This Report provides a comparison of the RI/FS Work Plans submitted by URS and SEH on August 22, 2003 and November 13, 2003, respectively. The Report details the information required to meet its goals as stated in Task 1 (A) 3 of the Statement of Work in the AOC:

- a) Provide a factual summary of the historical data and each data set's usage (e.g., qualitative or quantitative) in completing the RI/FS; and
- b) Identify the technical similarities and differences in the SEH and URS Work Plans for the purpose of identifying/addressing data gaps.<sup>1</sup>

The information described in this Report will provide the basis for the Technical Scoping Meeting between representatives of Xcel Energy, USEPA and the WDNR, scheduled for January 8, 2004, at USEPA Region 5 headquarters in Chicago.

This Report consists of two components. The first is a narrative that discusses the differences in the interpretation of existing data between the two plans and the resulting sampling programs required to close the perceived data gaps. The second is a side by side comparison of the two plans' sampling programs by media. This comparison is provided in the attached table.

<sup>&</sup>lt;sup>1</sup> Based upon the data validation efforts performed by USEPA and summarized in the SEH Work Plan, the historical data used for the preparation of these plans and the associated proposed sampling programs in each plan are acceptable for its intended use.



The following narrative discusses the site setting with regard to the four physiographic areas that comprise the site. It does not restate the detailed discussions of history and physiography provided in both plans. However, it does provide a brief area description, along with a discussion of the similarities and differences between the proposed sampling programs that are based on the conceptual models<sup>2</sup> of the site presented in each plan.

### Upper Bluff/Filled Ravine

The upper bluff/filled ravine encompasses the Xcel Energy property, the Our Lady of the Lake Parish property, and private residences within the area bounded by Kreher Park on the north, Prentice Avenue on the east, Lakeshore Drive on the south, and Ellis Avenue on the west. The former (filled) ravine begins at Lakeshore Drive at the Xcel Energy administrative office, and deepens and widens to the north. The mouth of the former ravine is at the bluff face north of St. Claire St., on the north end of the storage yard on Xcel Energy's property. The maximum depth at the ravine's mouth is approximately 30 feet. According to historic Sanborn maps, the ravine was filled beginning in the late 1800's and completed by 1909, although some additional filling of the St. Claire St. area has occurred since that time. The fill soils are underlain by the fine-grained Miller Creek formation, a variable silt clay unit that comprises the bluff overlooking Kreher Park.

The proposed characterization of this area is the same within both plans. The sampling programs for the remedial investigation in both plans address surface and subsurface soil, and vapor migration. The soil sampling programs are nearly the same. There is minor variability in the designation of background for surface soil samples, but the number and locations are essentially the same. The program for subsurface sampling is nearly identical; sampling depths are identical, although the SEH plan includes three additional (for a total of 43) sampling locations.

The sampling protocols are identical, with the exceptions that SEH includes TOC with the parameter list, and specifies that 10 percent of all SVOC samples will be analyzed for forensics (fingerprint) analyses. URS' plan does not include TOC on its parameter list nor does it include a provision for analyzing 10% of the SVOC samples for forensics analyses.

Significant variation exists between vapor sampling programs. URS proposes seventeen indoor air samples collected in summa canisters from nine locations. These include two each from nearby residences and Our Lady of the Lake School (one in the basement and one in the living space/classroom), and one from the Xcel Energy service building, which is built on a concrete floor slab. Three upwind canister samples are proposed for background. The SEH plan includes

<sup>&</sup>lt;sup>2</sup> Please note that the URS Work Plan does not contain a section titled 'Conceptual Model' as does the SEH Work Plan. However, the information contained in the section titled 'Initial Evaluation' in the URS plan, which discusses exposure pathways and the preliminary identification of response objectives, are substantially similar to the information in the 'Conceptual Model' section of the SEH plan.



vapor sampling from soil probes installed outside the foundations of nearby residences, the school and the Xcel Energy service building. SEH proposes that the results of the sampling conducted from these probes would be used to determine if an indoor air sampling program should be implemented.

Each plan proposes two vapor intrusion samples collected from two manholes in St. Claire Street. Analytical protocols include the TO-14 list for VOCs, and the TO-13 list for SVOCs for the URS plan; the TO-15 list for VOCs is proposed for the SEH plan.

### **Xcel Energy Comments**

There is little disagreement between the surface and subsurface soil sampling programs proposed in both plans. The differences between the surface soil background sample locations, and the number of subsurface soil sample locations, are not significant. However, Xcel Energy questions the value of adding TOC to the parameter list for soils. This is an attenuation parameter, and is also needed as an input parameter for groundwater modeling. Because the primary contaminant source in the Upper Bluff/Filled Ravine area is coal tar, the measurement of TOC in soil may be confounded by coal tar presence. Additionally, URS has not proposed groundwater modeling (see <u>Ancillary Tasks Comments</u>). With regard to collecting samples for SVOC or PAH forensics, the URS plan has proposed only limited forensics analyses on sediment samples <sup>3</sup>.

Xcel Energy also questions the SEH proposal to perform soil vapor sampling in lieu of indoor air sampling. The reasons are two-fold. First, experience with landfill monitoring for methane has shown that methane levels in soil probes installed adjacent to foundations in permeable soils can yield significant values (upwards of several percent by volume in air). This same experience has shown no detections at levels in the parts per million range measured at air space entry points in the adjacent structure. Methane from landfills migrates under pressure, while VOCs from a contaminant source not influenced by anaerobic degradation found in landfills (i.e., coal tar at this site) are not subject to pressure migration conditions. Second, the near surface soils in the Upper Bluff area outside the ravine consist of a thin layer of fill overlying fine-grained Miller Creek soils. VOC migration in these soils is unlikely. Vapor migration into structures under these conditions will likely follow preferential pathways in permeable backfill along utility trenches, and other coarse-grained fill soil pathways. URS' proposed indoor air sampling plan will determine actual vapor intrusion conditions of potentially hazardous compounds. However, Xcel Energy will consider seasonal sampling of the properties during both summer and winter to measure optimal migration effects caused by atmospheric temperature and pressure variations. Xcel Energy believes that soil vapor sampling alone outside of the foundations will be

<sup>&</sup>lt;sup>3</sup> Xcel Energy's proposal for forensics analyses data from the bay sediments is intended to address the relationship between the characteristics of PAH compounds found in the sediment including their bioavailability and the application of that information to ecological risk assessment, rather than for purposes of characterizing contaminant sources. For instance it is well-established that PAHs of pyrogenic origin, e.g. soot, are less bioavailable.



insufficient to satisfy property owners regardless of the results, and they will continue to question whether or not migration into their property has occurred.

Xcel Energy understands that the primary difference between the TO-15 list and the TO-14 list deals with the QA/QC protocols in the laboratory. Accordingly, Xcel Energy will default to the preference of USEPA. Xcel Energy has historically discussed the value and difficulties associated with sampling for the TO-13 list of SVOCs with the WDNR. The equipment and procedures needed for this effort makes sampling in manholes difficult, at best. Additionally, the potential for vapor migration of SVOCs is significantly less than VOCs. Accordingly, Xcel Energy will eliminate sampling for the TO-13 list from the program.

### Copper Falls Aquifer

The Copper Falls Aquifer is a moderately permeable hydrogeologic unit underlying the Miller Creek Aquitard beneath the entire site. From an area corresponding to the alley connecting Prentice Avenue and Third Avenue East on the Xcel Energy property, to the north below Kreher Park and below Chequamegon Bay, the aquifer is confined (artesian conditions exist at Kreher Park). A free-product plume has been measured in the aquifer from the area north of the alley to across St. Claire St., trending in a northwesterly direction; this corresponds to the direction of groundwater flow. The free-product plume is thickest immediately below the service center, but thins to the north and west, where it is found at the top of the aquifer near the interface with the Miller Creek Aquitard. (Xcel Energy installed a low-flow tar-removal system in the Copper Falls during 2000. Three extraction wells located at the south side of St. Claire St. and in the courtyard of the service center building actively removes tar from the aquifer.) Free-product has not been measured in wells installed in the Copper Falls Aquifer at Kreher Park. However, a dissolved phase plume has been measured in these wells, and the plume appears to extend beneath the bay, where the Miller Creek Aquitard thickens. The highest concentrations are found in wells screened at the top of the aquifer.

The proposed investigation plans described by both URS and SEH consist of the installation of additional monitoring wells, subsequent groundwater sampling, and borehole geophysics on selected wells to provide detailed lithologic definition. The proposed investigation programs found in each plan are essentially the same, including the proposed borehole geophysical investigation program. However, the SEH plan includes three additional wells located at the extreme downgradient extent of the dissolved phase plume that can be potentially accessed using conventional drilling technology. These three wells are proposed to be installed at the north end of Kreher Park along the shoreline, with screens set 10 feet into the Copper Falls Aquifer.

The sampling protocol is the same for both plans, with the exception that the SEH plan includes TOC. The SEH plan proposes six quarterly rounds of sampling. The URS plan proposes



sampling the new wells quarterly as part of the quarterly monitoring program currently in-place for the existing tar removal system.

SEH proposes to collect NAPL samples if encountered, and subject them to forensics analysis as proposed for the Upper Bluff. The URS plan has no such proposal.

### **Xcel Energy Comments**

Xcel Energy agrees that there is potential value in the three additional monitoring wells proposed in the SEH plan. However, Xcel Energy recommends that these three wells be screened just below the interface between the aquifer and the overlying Miller Creek Formation. Historic data from existing well nests shows that the dissolved phase plume thins in the downgradient direction, and due to the upward gradients in the confined aquifer, restricts the bulk of contamination to the top of the aquifer.

As discussed previously, Xcel Energy does not believe in the value of adding TOC to the parameter list. In addition, Xcel Energy does not propose forensics analysis for any area except for the sediments.

#### Kreher Park

Kreher Park encompasses the entire filled area north of the bluff face that is reclaimed land from the former lake bed. This area includes Kreher Park, the Canadian National Rail corridor located at the base of the bluff, the former Ashland POTW, the marina that is the extension of Ellis Avenue, and the boat landing that is the extension of Prentice Avenue. It is bounded by the bluff face to the south and Chequamegon Bay to the north, east and west. The fill consists of soil, demolition debris and waste wood remaining from the former lumber mills that operated on the site at the turn of the 20<sup>th</sup> century, until the 1930's. The fill varies from less than five feet thick at the bluff face to about 12 feet thick at the shoreline. A former solid waste disposal area operated in the western portion in the 1940's, and an area that has been identified on historical maps as the 'Coal Tar Dump' was previously located in the east central portion of the Park. A groundwater source that until recently discharged intermittently to the ground surface, referred to as 'the seep', was located north of the rail corridor at the mouth of the filled ravine.

Investigations by the WDNR and Xcel Energy in 2001 determined that the source of this discharge was a drain tile installed at the base of the former ravine prior to its filling. (The former drain tile was crushed in several places during investigation of the tile, effectively eliminating its capacity as a conduit.) The seep area was then formally remediated through an interim action performed by Xcel Energy during 2002. A float activated extraction well was installed on the Xcel Energy property at the north end of the storage yard, intersecting the base of the ravine at its mouth. The discharge from this well is routed to the tar removal system located



in the courtyard of the service building. In addition, a low permeability soil and geotextile cap was installed over a wide area north of the seep to prevent direct contact with contaminated soils.

The physical characterization of Kreher Park is essentially the same in both the URS and SEH plans although there is significant disagreement as to the sources of the existing contamination, which is a discussion beyond the scope of this Report. There is also considerable variation in the proposed sampling programs. Although each sampling program includes soil, groundwater and vapor migration sampling, the proposed plans vary significantly in their implementation.

Each plan proposes a series of exploratory test pits to investigate both the former solid waste disposal area and the coal tar dump area. URS' plan involves a series of pits around the exterior of each area to define the boundaries of the area. URS proposes to collect grab samples during these excavations for visual and physical classification, and conduct TCLP testing on them for potential hazardous waste categorization. The SEH plan proposes exploratory trenches traversing the width of each area. Four equidistant trenches are proposed across the solid waste area, and five across the coal tar dump area. Surface and subsurface soil samples are to be collected from each trench. A total of 24 samples (12 surface and 12 subsurface) are proposed for collection from the solid waste area trenches, and 22 samples (11 surface and 11 subsurface) are proposed from the coal tar dump area trenches. The analysis protocol for these samples is the same as for the upper bluff area.

Both plans also propose geoprobe/direct push samples for analyses. The number of borings is essentially the same. URS proposes 30 in the solid waste, coal tar and dump areas and along utility corridors; SEH proposes 29 in the seep and general area, including four for background, two each west of Ellis and east of Prentice Avenues. URS proposes collecting samples every 10 feet of drilling; SEH proposes two samples from each boring, one at the surface and one from five to seven feet. Analyses protocols are the same as for the upper bluff area.

For groundwater, URS proposes replacing monitoring well MW-7, abandoned during the seep remediation project in 2002. The proposed sampling program consists of MW-7 along with five existing monitoring wells for the same analytical protocol specified for the Copper Falls Aquifer. No number of sampling events is specified. SEH proposes installing six new water table monitoring wells, and sampling them in addition to the same five existing wells included in the URS plan. The analysis protocol is the same as proposed for the Copper Falls Aquifer; six sampling rounds are proposed.

As for the Upper Bluff and Copper Falls Aquifers, SEH proposes that NAPLs encountered during any of the sampling efforts be analyzed for forensics.

Vapor sampling in the former POTW is also planned. URS proposes canister sampling in the basement of the building although no number is specified. SEH proposes collecting three



canister samples on each floor, along with sub-slab gas samples. The methodology for the sub-slab samples is not specified. Analytical protocols are the same as proposed for the Upper Bluff.

URS proposes sampling surface water reportedly infiltrating the basement of the POTW. One sampling event is planned. SEH provides no comparable alternative plan.

### Xcel Energy Comments

The end result of the data proposed for collection by the two plans is similar. Surface and subsurface soils, groundwater and potential vapor intrusion samples (collected in the POTW) will be analyzed for the same parameters. The only significant difference is the additional number of surface and subsurface samples collected via SEH' proposed trenching program.

Xcel Energy questions the value of this trenching program. In its plan for the sampling programs for the coal tar dump, solid waste and general areas at Kreher Park, SEH states that its rationale is based on a systematic grid design to find "hotspots." The trenching program will be difficult and have inherent physical restrictions. Xcel Energy's experience during the seep remediation shows that the composition of the fill consists of large debris and slab wood; the proposed trenches across the former solid waste area are in excess of 300 feet. Excavation of these trenches and the disposition of the excavated materials will be problematic. The excavated soils will have to be excavated and stockpiled in the park during the investigation. These stockpiles will be large, and will have to be covered and managed to control surface runoff, dust emissions, odors and public contact, to mitigate potential health concerns. Additionally, the proposed trenching program at the coal tar dump area may potentially breech the existing soil and geotextile cap installed during the seep interim action. A related concern at the seep location is the necessity of collecting surface samples from the area where the engineered cap was installed.

Xcel Energy also questions the value of using this trenching methodology to attempt to determine hotspots. SEH has collected a substantial volume of data from Kreher Park during past investigations. Additional characterization of the known features at the Park (coal tar dump, solid waste and seep areas) can be effectively gathered using less intrusive geoprobe and test pit techniques. The heterogeneities of the fill at Kreher Park have shown that much of the entire area is contaminated. With the exception of the seep area where free-product was historically measured, no other area of the Park yielded contaminant levels indicative of other hot spots. A less disruptive exploratory program can be utilized to confirm evidence of other hotspots, if additional, as yet undefined, areas exist. In that event, a future more detailed exploratory program can be devised. Xcel Energy will consider increasing the number of exploratory test pits and geoprobe samples across the Park area to increase coverage. Test Pits and geoprobe sampling can gather substantially the same information as the trenches with much less difficulty and risk.



In addition, Xcel Energy will consider installing two or three additional water table monitoring wells, especially those close to the shoreline to better monitor the relationship between the sediments and the uncontrolled fill. Xcel Energy will also finalize a sampling schedule and consider several groundwater sampling events during the remedial investigation phase. The company believes its proposed sampling protocol for analyses is sound, and forensics analysis on samples from Kreher Park is unnecessary.

As discussed for the vapor sampling plan at the Upper Bluff, Xcel Energy will consider restricting vapor analyses on samples collected in the POTW to the VOC scan preferred by USEPA.

### **Chequamegon Bay Sediments**

The area of Chequamegon Bay that is impacted is a partially protected inlet beyond the Kreher Park shoreline north of the former POTW, bounded on the east by the boat landing extension of Prentice Avenue, and the west by the marina extension of Ellis Avenue. Levels of contaminants in the sediments decrease significantly in northern portions of the inlet and contaminants are not detected above regional levels in the sediments in adjoining open waters of the Bay.

Both URS and SEH have conducted several phases of investigation to characterize the extent of contamination in the Bay. In addition, SEH has performed biological sampling and developed two separate preliminary ecological risk assessment reports. SEH performed the most recent investigation during March, 2003. This 2003 work included further horizontal, vertical and background sediment characterization.

During March 2003, representatives of USEPA, WDNR and Xcel Energy met in Ashland to discuss URS' "Strawman Baseline Problem Formulation". This report had been developed by Xcel Energy to use as an approach to evaluate the Bay sediments following federal guidance for ecological risk assessment (ERAGS; USEPA, 1997) and USEPA's principles for managing contaminated sediment sites (USEPA, 2002). In particular, the report was intended to meet the objectives described in Step 3 (Baseline Problem Formulation) and Step 4 (Study Design and Data Quality Objective Process) of the ERAGS process. Agreements were made at that meeting to follow this process and assignments and deliverable due dates were agreed upon. However, no further contact occurred between URS and SEH for this purpose.

URS' August work plan proposed to use the March 2003 sediment data to further characterize the nature and extent of sediment contamination in Chequamegon Bay by developing two-dimensional vertical profiles and three-dimensional isopleths of the contaminant distribution in these sediments. In addition, the URS work plan described a number of other validation studies (Section 5.1.4.5) that would potentially be developed pending the conclusions of the Problem Formulation Process. It was URS' understanding at that time that, consistent with ERAGs



guidance and contaminated sediment management principles, completion of this process would involve agency representatives as well as other Interested Parties. As such, most of the URS work plan was conceptual and tentative in nature.

SEH' work plan includes the results of the March data, plus many of the elements of the Baseline Problem Formulation and Data Quality Objective Process. Although comparing URS conceptual plan to SEH' more detailed work scope is difficult, the attached table attempts to compare the individual program efforts. Note that this comparison also includes the Baseline Problem Formulation process that was agreed to by all parties in March 2003.

#### **Xcel Energy Comments**

Xcel Energy does not believe that the Problem Formulation presented in the SEH work plan has been consistent in developing a clear and transparent relationship between the proposed sampling and analyses program and the risk management decisions that will have to be made. URS' Strawman report recognized that in addition to the proper development of this decision making process, the additional objectives reflecting the relevant Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites (USEPA 2002) should be incorporated into the Problem Formulation Process as well.<sup>4</sup> There appears to be no effort in the SEH Problem Formulation to consider these principles (although a reference to developing a potential sediment stability model is made in Section 5.5.3). In addition, there appears to be no attempt to develop specific 'cause and effect' decision criteria and a specific weight of evidence framework to which all parties have had an opportunity to contribute. As a result, the process is vulnerable to the same shortcomings that have already been experienced. Namely, if this program is performed in accordance with this plan the parties will debate how the outcome of the studies will be used to support risk management decisions.

The program comparison in the attached table shows that the SEH work plan appears to base its entire ecological risk assessment analyses program on the results of data from eight sample locations. There is no rationale presented for this sample size, except for the statement in Section 4.2.3.3.2 Statistical Considerations 'A sample size of 30 would be ideal however due to financial considerations the number of sampling locations will be limited to 8.' In addition there is no expressed rationale for each of the locations proposed in the SEH plan. The potential exists that higher zones of contamination near any of the proposed sampling locations will have adverse effects on the resulting data, leading to biased conclusions. Although the testing programs proposed in the plan appear to be appropriate, this justification for sample size appears to be severely limiting. Although cost is a factor in all investigations, Xcel Energy believes that

<sup>4</sup> These include, but are not necessarily limited to: Principle 2: Involve the Community Early and Often; Principle 3: Coordinate with States, Local Governments, Tribes and Natural Resource Trustees; Principle 4: Develop and Refine a Conceptual Site Model that Considers Sediment Stability, and Principle 8: Ensure that Sediment Cleanup Levels are Clearly Tied to Risk Management Goals.



decisions made to modify sampling programs on the basis of cost constraints must include an explicit understanding of the effect of this decision on the outcome of the studies. The USEPA DQO process describes how this evaluation is conducted. It appears that the reduction in sample size in the SEH plan is arbitrary and not the result of a DQO process.

Xcel Energy believes that it is inappropriate to critique the specific studies described in the SEH work plan in this memorandum. This has not proven a productive process in the past. Rather, Xcel Energy proposes that the Baseline Problem Formulation process be initiated as was originally intended using the SEH work plan and the URS "Strawman" as the bases.

To initiate this process Xcel Energy has incorporated all existing sediment data into a GIS platform (ARCGIS1<sup>TM</sup>). Xcel Energy will be prepared at the January meeting to present an overview of sediment data, including two-dimensional vertical profiles and three-dimensional isopleths, of contaminant distribution in these sediments using this platform. It will include not only historic and recent data for the sediments, but historic data for the entire site. With this tool we can evaluate more directly the spatial and vertical characteristics of contaminant distribution.

### **Ancillary Tasks Comments**

Two separate tasks referenced in the SEH work plan that have been separated from the discussion of the area investigations include groundwater modeling and data validation. These tasks are addressed separately because the URS and SEH plans propose significantly different outcomes.

With regard to numerical groundwater modeling, URS has not proposed to include it with the program based upon the level of field data that been developed to date. Modeling of the groundwater in the filled ravine and at Kreher Park is unnecessary. Both hydrogeologic units are small in areal extent, have been well characterized, and ultimately discharge to the bay. The existing free-product measured in these units is known (it is restricted to the upper reaches of the filled ravine and the area near the seep), and can be tracked using the existing and proposed well-network. Because of the extent of the dissolved phase plume in this fill, there is little benefit to developing a numerical model for predictive purposes.

For the Copper Falls Aquifer, the same conditions discussed for the filled units apply with regard to the free-product plume. It has been tracked and can continue to be tracked using the existing and proposed groundwater monitoring network. With regard to the dissolved phase plume, the migration of the plume beneath the bay has been determined. The additional monitoring wells proposed by URS and SEH will provide further characterization, but the obvious limitation created by the bay prevents calibration of a numerical model beyond the shoreline. Consequently, there is no predictive value for such a model



With regard to data validation, SEH has proposed in Section 5.4.3 of its work plan that "100 percent of data collected for regulatory compliance purposes (contaminant delineation, risk assessment, and modeling) will be subject to third party data validation and potential EPA Region V audit." During the negotiation for the AOC, USEPA indicated it would consider a Tier 3, 10 percent data validation package on all analyses data. USEPA further stated at that time that this data validation procedure should be detailed in the final QAPP.

We appreciate the opportunity to have prepared this Report, and look forward to discussing the details of the issues previously discussed at the project scoping meeting on January 8, 2004.

Sincerely,

**NewFields** 

David P. Trainor, P.E., P.G.

April of Trainor

Associate

cc: Jerry Winslow
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Tinner Rinff/Rayine Fill	IIRS Work Plan	SEH Work Plan
Surface Soil Samples	12 samples/0.25 – 1 ft depth; 4 sample locations designated for background to the south, west (2) and east of the former ravine: 8 sample locations in the ravine area along St.	12 samples/ 0 – 1 ft. depth; four sample locations designated for background to the south; three other sample locations match background locations to the
	Claire St. and in the storage yard.	east and west (2) in URS Plan; three locations along St. Claire St. and two in storage yard.
	<ul> <li>Analyte list includes VOCs, SVOCs, and selected inorganics.</li> </ul>	<ul> <li>Analyte list same as URS Plan, plus TOC. Ten percent of all SVOC samples analyzed for forensic fingerprinting.</li> </ul>
Subsurface Soil Samples	40 sample locations/samples at 5, 10 & 15 ft. depth; locations straddle former ravine in courtyard and beneath slab floor of Xcel Energy service building. Three background locations along Lakeshore Drive	43 sample locations/sample regime identical to URS Plan; sample locations identical to URS Plan, except three additional locations near groundwater treatment building in courtyard of service building.
	<ul> <li>Analyte list same as surface soil.</li> </ul>	<ul> <li>Analyte list same as surface soil.</li> </ul>
Vapor Samples	Seventeen indoor air summa canister samples from nine locations. Locations include five residences along St. Claire St., two residences along Prentice, (two from each	Twelve soil vapor probes at minimum five ft. depths. Locations include five south of each residence along north side of St. Claire St., five surrounding service
	residence; one in living space and one in basement), Our Lady of the Lake School (one in classroom and one in basement), and one in service building.	building, one in courtyard, one on east side of Our Lady of the Lake School.
	<ul> <li>Two vapor intrusion samples from two manholes along St. Claire St.</li> </ul>	■ Two vapor intrusion samples from two manholes along St. Claire St.
	<ul> <li>Three exterior, upwind canister samples for background.</li> </ul>	<ul> <li>Indoor air sampling contingent upon findings in soil vapor probes.</li> </ul>
	<ul> <li>Analyte list includes TO-13, TO-14 collected one time.</li> </ul>	<ul> <li>Analyte list includes TO-15 collected seasonally, once during summer and once during snow cover.</li> </ul>

SEH Work Plan	Residual waste or analyzed for sam SVOC samples w fingerprinting an		Ten piezometers at eight locations. Seven are identical to URS Plan. Additional three in SEH Plan include far downgradient piezometers, one at Marina, one west of former WWTP at shoreline, and one northeast of former WWTP at shoreline. Screens set 10 feet into Copper Falls.	<ul> <li>Sampling frequency includes six quarterly rounds</li> </ul>	<ul> <li>NAPL encountered will be sampled for forensics analysis.</li> </ul>	<ul> <li>Analyte list same as URS Plan plus TOC.</li> </ul>
URS Work Plan	yses.	URS Work Plan	Seven piezometers at five locations; each piezometer is nested with either an existing or proposed monitoring well. Screens set either just below the Miller Creek aquitard and/or 20 feet below, with the exception of MW-2C, advanced to bedrock ( $200\pm \mathrm{ft.}$ ). Locations intended to provide definition of vertical and horizontal extent of dissolved phase plume.	<ul> <li>Sampling frequency includes addition of proposed piezometers to quarterly sampling program for interim tar-removal system (29 existing wells).</li> </ul>	<ul> <li>No plan for forensic or fingerprinting analyses.</li> </ul>	<ul> <li>Analyte list includes VOCs, SVOCs, and selected inorganics.</li> </ul>
Upper Bluff/Ravine Fill	Residual Waste Samples	Copper Falls Aquifer	Monitoring Wells/Piezometers			

W- Program is identical to URS Plan.	SEH Work Plan		<ul> <li>excavated across coal tar dump area. Trenches located approximately equidistant from each other to maximize surface area coverage.</li> </ul>	■ 12 surface and subsurface samples from solid waste area (24 samples); 11 from coal tar dump area (22 samples). Surface samples from 0 – 1 ft. depth, subsurface from 5 – 7 ft. depth.	<ul> <li>NAPL encountered will be sampled for forensics analysis.</li> </ul>	<ul> <li>Analyte list includes same program as surface/subsurface soil for Ravine Fill.</li> </ul>
URS Work Plan Natural gamma and electromagnetic conductivity on MW-2C, MW-2A(NET) and artesian wells AT-1 and AT-2; video logging of well casing on AT-1 and AT-2	URS Work Plan	Eight exploration test pits to define extent of former solid waste disposal area; six test pits to define extent of former	coal tar dump area. Pit advanced to 6 -8 feet to define fill, or limit of excavation.	<ul> <li>Grab samples collected for visual classification; selected samples for TCLP analysis.</li> </ul>	<ul> <li>No plan for forensic or fingerprinting analyses.</li> </ul>	<ul> <li>Analyte list restricted to TCLP analyses on health parameters from selected samples.</li> </ul>
Copper Falls Aquifer Borehole Geophysics	Kreher Park	Exploration Test Pits	(Investigation of former waste disposal area and former coal tar dump area)			

Kreher Park	URS Work Plan	SEH Work Plan
Vapor Samples	Vapor intrusion samples collected via canisters in basement of former WWTP. Number unspecified.	Six vapor intrusion samples collected from former WWTP, three from each floor. Sub-slab soil-gas samples also collected inside former WWTP (number unspecified).
	<ul> <li>Analyte list includes TO-13, TO-14.</li> </ul>	<ul> <li>Analyte list includes TO-15.</li> </ul>
Chequamegon Bay Sediments	URS Work Plan	SEH Work Plan
Baseline Problem Formulation	Initial Problem Formulation Process presented in "Strawman Baseline Problem Formulation for Affected Bay Sediments" prepared by URS, March 2003. URS advocates an interactive approach with agencies and other Interested Parties to complete this process. Objectives of the Problem Formulation include:	Presents Section 4.2 'OU#4 Ecological Risk Assessment Problem Formulation and Study Design' in Work Plan.
	<ul> <li>Develop conceptual site model which incorporates sediment stability evaluation.</li> </ul>	describes potential sources, potential exposed receptors, and previous results of analyses that led to preliminary response objectives and remedial action alternatives (SEH, 1998a, b, c in Work Plan references).
	<ul> <li>Develop risk management goals and objectives.</li> </ul>	• Management goal stated in Section 4.2.2.1 to 'Restore, protect and maintain the habitat and water quality conditions of the near shore area off Kreher Park' Ten specific management objectives stated in Section 4.2.2.2.
	<ul> <li>Recommend assessment endpoints and associated risk hypotheses.</li> </ul>	<ul> <li>Assessment endpoints and risk questions described in Table 16.</li> </ul>

Chequamegon Bay Sediments	URS Work Plan	SEH Work Plan
Baseline Problem Formulation, (continued)	<ul> <li>Propose measurement endpoints to address risk hypotheses.</li> </ul>	<ul> <li>Measurement endpoints described in Table 16.</li> </ul>
	<ul> <li>Use DQO process to develop work scope to address data needs and risk hypotheses, tolerable errors and decision criteria.</li> </ul>	Some aspects of the DQO process is described in Section 4.2.3.3, which refers to Tables 17 – 25 for sediment and surface water chemistry as well as some of the validation studies.
	<ul> <li>Sampling stations, sample replication and analytical methodology for any supplemental validation studies will be decided as part of the DQO process during the Problem Formulation.</li> </ul>	<ul> <li>Section 4.2.3.3.2 describes 'A sample size of 30 would be ideal however due to financial considerations the number of sampling locations will be limited to 8.'</li> </ul>
	Determine range of reference (ambient) concentrations for COPCs. Compare both historical and March 2003 sediment data to sediment data from other nearby areas (e.g., Barksdale) unaffected by point sources of contamination. Perform an evaluation of wood waste impact.	Number of reference stations limited to two. How these will be used to control wood bark, contaminant and grains size differences not specified.
	<ul> <li>Analyte list for further sediment and surface water sampling will be determined as part of Problem Formulation</li> </ul>	Analysis program to include VOCs, SVOCs, expanded hydrocarbons, TOC, cyanide, copper, lead, mercury, zinc, and AVS/SEM
Sediment Characterization Work Proposed	<ul> <li>Develop two- and three-dimensional isopleths using both historical and March 2003 sediment data.</li> </ul>	<ul> <li>Isopleth program unspecified.</li> </ul>
	<ul> <li>Perform forensic analyses on selected sediment samples to evaluate bioavailablility characteristics.</li> </ul>	Specific forensic program for sediments unspecified; however, references to previous methods for analyses will be used if NAPLs encountered.

SEE Work Plan	is is reference in Sediment stability evaluation unspecified; however, reference in Section 5.5.3 to sediment stability modeling as part of a potential future work plan. reasport sediment work plan.	son of Sample locations for ERA to include same eight as above sediment characterization studies. Sample locations for HHRA will include 10 other near shore locations, except one co-located with ERA.	of Problem Studies already proposed in Work Plan based upon SEH Problem Formulation:	ediment sample locations (two reference locations); toxicity testing program to consist of eight sample locations (two reference locations); toxicity testing program to consist of eight sample locations for 28-day life-cycle chronic toxicity, plus standard and UV light on Chironomus tentans; caged mussel program determined by three cages at eight locations (two background) for 90-day in-situ test; fish impact program will consist of eight samples of American smelt to be collected from locations to be determined by WDNR Fisheries staff (eight for HHRA and eight for ERA); same program for two of three species selected from walleye, lake trout and round whitefish; or, yellow perch, smallmouth bass, northern pike or burbot if sufficient samples not retrieved from earlier list, in order of preference; wildlife fish ingestion program unspecified.
URS Work Plan	Perform a sediment stability evaluation. This is described in detail in the URS work plan. This will include evaluation of surface water quality as well as an evaluation of sediment and surface water transport characteristics will be evaluated as part of the sediment stability investigation proposed in the URS work plan.	One element of this study plan is a comparison of contaminant levels in the water column over undisturbed sediments to levels existing in the water column over recently disturbed sediments. It hasn't been determined whether this evaluation will be after the disturbance resulting from natural events or following manual disturbance.	Other possible studies depending upon outcome of Problem Formulation process:	Further sediment characterization studies may include pore water, benthic community structure, sediment toxicity investigations, caged mussel bioaccumulation studies, fish impact studies, and (potentially) wildlife fish ingestion studies or other studies depending upon the assessment and measurement endpoints agreed upon during the Problem Formulation.
Chequamegon Bay Sediments	Sediment Characterization Work Proposed (continued)		Baseline Ecological and	Assessment

SEH Work Plan	Section 5.5.3 'Mathematical models will be developed to predict the fate and transport of NAPLs and dissolved phase COPCs in groundwater. The primary purpose of the modeling effort will be to estimate the limits of the plume within the Copper Falls Aquifer below the bay.'	Section 5.4.3 'In the future, 100 % of data collected for regulatory compliance purposes (contaminant delineation, risk assessment and modeling) will be subject to third party data validation and potential EPA Region V audit.'
URS Work Plan	No program specified	No specific program specified; During AOC negotiations USEPA indicated it would consider a Tier 3 data validation effort on 10 percent of all analyzed data. Details will be specified in final QAPP.
Ancillary Tasks	Groundwater Modeling	Data Validation